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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/715,107	11/18/2003	Junichiro Hara	062709-0117	3998

22428 7590 11/13/2006

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EXAMINER	
EDWARDS, LOREN C	
ART UNIT	**PAPER NUMBER**
3748	

DATE MAILED: 11/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/715,107	HARA, JUNICHIRO	
	Examiner	Art Unit	
	Loren C. Edwards	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☒ Claim(s) *19 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. An Applicant's Request for Continued Examination filed on 11/3/06 has been entered. Claim 1 has been amended; and claims 15-20 have been added. Overall, claim 1-20 pending in the application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1, 2, 4-6, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole et al. (U.S. 6,318,077) in view of Grant et al. (U.S. 6,272,850). Claypole discloses an exhaust-heat recovery system for a vehicle comprising: a catalytic converter (Claypole; Fig. 1, No. 34; Col. 3, Lines 34-38) configured to let pass exhaust discharged from an engine and to burn catalytically combustible components in the exhaust; an exhaust heat exchanger (Claypole; Fig. 1, Nos. 38 and 60; Col. 3, Lines 39-41; Col. 3, Lines 63-65) configured to exchange heat

between the exhaust having passed through the catalytic converter and a heat transfer medium having passed through the engine; and an air conditioner (Claypole; Fig. 1; Col. 4, Lines 42-54) with a heat exchanger configured to generate a heating wind by means of the heat exchange between the heat-transfer medium having passed through the exhaust heat exchanger and an air conditioning wind. Claypole fails to specifically describe an engine controller configured to perform an incremental control for increasing the combustible components in the exhaust to be burned in the catalytic converter by means of changing an operation condition of the engine when a prescribed heating condition is unsatisfied, wherein a performance of the incremental control is dependent on a motion condition of the vehicle, a load condition of the engine, the operation condition of the engine, a condition of a coolant and a capacity of the catalytic converter. Grant discloses a catalytic converter temperature control system that uses unburned hydrocarbons, by making the charge rich, to elevate and maintain the temperature of a catalyst (Grant; Abstract; Figs. 2, and 3; Col. 2, Line 55 – Col. 3, Line 42). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the control of Grant in the system of Claypole for the advantage of being able to bring a catalyst to operating temperature and maintain that temperature using no additional injection hardware. The examiner notes that the control of Grant is only performed while the engine is operating and therefor the performance of the incremental control is dependent on operation condition of the engine.

5. With regards to claim 2, the modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, and further wherein the incremental

control on the combustible components is such that the amount of unburned hydrocarbon in the exhaust discharged from the engine is increased (Grant; Col. 2, Line 62 – Col. 3, Line 5; Abstract).

6. With regards to claim 4, the modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, and further wherein the prescribed heating condition is specified by at least one of a temperature of the heat-transfer medium, a demand for an increase in heating power of the air conditioner, and an exchange heat quantity in the exhaust heat exchanger (Claypole; Col. 4, Lines 42-54).

7. With regards to claim 5, the modified Claypole discloses the exhaust-heat recovery system of claim 4, as described above, and further wherein the temperature of the heat-transfer medium is measured at, at least one of a heat-transfer medium channel from the engine to the exhaust heat exchanger, a transfer medium channel from the exhaust heat exchanger to the heat exchanger, a heat-transfer medium channel from the heat exchanger to the engine, a heat-transfer medium passage within the engine, a heat-transfer medium passage within the exhaust heat exchanger and a heat-transfer medium passage within the heat exchanger (Claypole; Fig. 1, No. 74; Col. 3, Lines 53-55).

8. With regards to claim 6, the modified Claypole discloses the exhaust-heat recovery system of claim 4, as described above, and further wherein the demand for an increase in heating power of the air conditioner is outputted from the air conditioner on the basis of at least one of the difference between a target temperature in the vehicle set by an occupant and an actual temperature in the vehicle or an actual temperature

outside the vehicle, and a target temperature of an air conditioning wind at an outlet thereof (Claypole; Col. 4, Lines 46-48).

9. With regards to claim 15, the modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, and further wherein the engine controller is configured to: determine a state of operation of the engine, wherein the state of operation of the engine is selected from the group consisting of the engine being in operation and the engine being at rest; and upon a determination of the state of operation of the engine, (i) perform the incremental control if a determination is made that the engine is in operation, and (ii) prevent performance of the incremental control if a determination is made that the engine is at rest (Claypole; Figs. 2 and 3 operated only when engine is running). The examiner notes that while Grant is silent to the operation of Figures 2 and 3 only being executed while the engine is running, Grant teaches to feed a gas with a specific air/fuel ratio to the catalyst, which can only occur while the engine is running. Because Figures 2 and 3 of Grant only occur while the engine is running, the determination to the operational state of the engine is inherently included.

10. Claim 1, and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole et al. (U.S. 6,318,077) in view of Nishimura et al. (U.S. 6,345,499). Claims 1, 2, 4-6, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole et al. (U.S. 6,318,077) in view of Grant et al. (U.S. 6,272,850). Claypole discloses an exhaust-heat recovery system for a vehicle comprising: a catalytic converter (Claypole; Fig. 1, No. 34; Col. 3, Lines 34-38) configured to let pass exhaust discharged from an engine and to burn catalytically combustible components in the

exhaust; an exhaust heat exchanger (Claypole; Fig. 1, Nos. 38 and 60; Col. 3, Lines 39-41; Col. 3, Lines 63-65) configured to exchange heat between the exhaust having passed through the catalytic converter and a heat transfer medium having passed through the engine; and an air conditioner (Claypole; Fig. 1; Col. 4, Lines 42-54) with a heat exchanger configured to generate a heating wind by means of the heat exchange between the heat-transfer medium having passed through the exhaust heat exchanger and an air conditioning wind. Claypole fails to specifically describe an engine controller configured to perform an incremental control for increasing the combustible components in the exhaust to be burned in the catalytic converter by means of changing an operation condition of the engine when a prescribed heating condition is unsatisfied, wherein a performance of the incremental control is dependent on a motion condition of the vehicle, a load condition of the engine, the operation condition of the engine, a condition of a coolant and a capacity of the catalytic converter. Nishimura discloses a catalyst light-off method for an internal combustion engine application that teaches to perform an incremental control (Nishimura; Col. 6, Lines 43-58) for increasing the combustible components in the exhaust to be burned by the catalytic converter by means of changing an operation condition of the engine when a prescribed heating condition is unsatisfied (Nishimura; Col. 6, Lines 23-42), wherein a performance of the incremental control is dependent on a load condition of the engine (Nishimura; Col. 6, Lines 38-58). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the catalyst temperature control method of Nishimura in the system of Claypole for the advantage of being able to accomplish

quick light-off and emission improvement by an increase in the exhaust gas temperature while the catalyst s still in its unheated state (Nishimura; Col. 2, Line 56 – Col. 3, Line 6).

11. With regards to claim 16, the modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, and further wherein the engine controller is configured to: determine whether the engine is loaded (Nishimura; Col. 6, Lines 38-42); and prevent performance of the incremental control if a determination is made that the engine is loaded (Nishimura; Col. 6, Lines 43-58).

12. With regards to claim 17, the modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, and further wherein the engine controller is configured to: determine whether the engine is unloaded (Nishimura; Col. 6, Lines 38-42); and perform incremental control if a determination is made that the engine is unloaded (Nishimura; Col. 6, Lines 43-58).

13. With regards to claim 18, the modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, and further wherein the engine controller is configured to: determine whether the temperature of the coolant is at a temperature selected from the group consisting of higher than, less than and equal to a prescribed temperature; and (i) if a determination is made that the temperature of the coolant is less than the prescribed temperature, permit incremental control, and (ii) if a determination is made that the temperature of the coolant is higher than or equal to the prescribed temperature, prevent incremental control (Nishimura; Col. 6, Lines 23-37).

14.

15. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 2 above, and further in view of Nozawa et al. (U.S. 6,266,957). The modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, but fails to specifically discuss the incremental control on the combustible components being performed when the vehicle is at rest but the engine is still in operation. Nozawa discloses a catalyst activation control system for engines that enables catalyst warm-up when the engine is in park or neutral (Nozawa; Col. 10, Lines 48-65). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the catalyst activation control at taught by Nozawa in the system of Claypole for the advantage of rapid temperature rise to activate the catalyst after cold starts.

16. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 4 above, and further in view of Barroni-Bird et al. (U.S. 5,983,628). The modified Claypole discloses the exhaust-heat recovery system of claim 4, as described above, but fails to specifically describe the system wherein the exchanged heat quantity in the exhaust heat exchanger is calculated from at least one of the differences between a temperature of the heat-transfer medium at an inlet portion of the exhaust heat exchanger and that at an outlet portion of the exhaust heat exchanger, the difference between a temperature of the exhaust at an inlet portion of the exhaust heat exchanger and that at an outlet portion of the exhaust heat exchanger, the difference

between a volumetric flow rate of the exhaust at an inlet portion of the exhaust heat exchanger and that at an outlet portion of the exhaust heat exchanger, the exhaust volume in the engine, the exhaust temperature in the engine, the amount of fuel used in the engine, and the amount of air used in the engine. Barroni-Bird discloses a system and method for controlling exhaust gas temperatures for increasing catalyst conversion that has temperature sensors located immediately upstream and downstream of a heat exchanger (Barroni-Bird; Fig. 1, Nos. 52 and 54). These sensors are used to determine the amount of heat dissipated by the exchanger (Barroni-Bird; Col. 4, Line 40 – Col. 5, Line 3). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the heat exchanged quantity detection as taught by Barroni-Bird in the system of Claypole for the advantage of being able to control the temperature of the exhaust emissions (Barroni-Bird; Col. 2, Lines 19-31).

17. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 1 above, and further in view of Rim (U.S. 6,739,579). The modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, but fails to specifically disclose: a bypass channel along which the exhaust having passed through the catalytic converter passes bypassing the exhaust heat exchanger; a main channel along which the exhaust having passed through the catalytic converter passes through the exhaust heat exchanger; and an exhaust channel switching valve for closing either the bypass channel or the main channel. Rim discloses an exhaust valve for combustion engines comprising a bypass channel along which the exhaust having passed through the catalytic converter passes bypassing the

heat exchanger (Rim; Fig. 2, No. 28; Col. 3, Lines 1-51); a main channel along which the exhaust having passed through the catalytic converter passes through the exhaust heat exchanger (Rim; Fig. 2, No. 34; Col. 3, Lines 1-51); and an exhaust channel switching valve for closing either the bypass channel or the main channel (Rim; Fig. 2, No. 10; Col. 3, Lines 1-51). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the bypass valve system of Rim in the system of Claypole for the advantage of being able to throttle the amount of additional heat added to the engine coolant.

18. With regards to claim 9, the modified Claypole of claim 8 discloses the exhaust-heat recovery system of claim 1, as described above, and further wherein the exhaust discharged from the engine passes sequentially through the catalytic converter, the exhaust heat exchanger and a muffler toward the downstream side of the engine, and then is discharged into the air (Rim; Fig. 1, Nos. 22, 12, 24, and 26; Col. 3, lines 1-51).

19. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 1 above, and further in view of Tramontini (U.S. 3,223,150). The modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, but fails to specifically discuss the heat-transfer medium flowing out of the engine, passing sequentially through the exhaust heat exchanger, the heat exchanger for heating the passenger compartment, and returning to the engine. Tramontini discloses a heat exchanger where engine coolant is fed through a heat exchanger in the exhaust track (Tramontini; Fig. 1, No. 40), through a heat exchanger in the passenger compartment (Tramontini; Fig. 1, No. 18), and then returns to the engine (Tramontini;

Fig. 1, No. 26). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the heat exchanger as taught by Tramontini in the system of Claypole for the advantage of shortening the time required to bring the coolant in the system to a sufficient temperature to supply heat to the passenger cabin (Tramontini; Col. 1, Lines 51-56).

20. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 1 above, and further in view of Bennett (U.S. 6,151,891). The modified Claypole discloses the exhaust-heat recovery system according to claim 1, as described above, but fails to fully describe the system comprising an oil warmer for generating the heat exchange between the heat-transfer medium and a transmission lubricant on the downstream side of the heat exchanger for heating. Bennett discloses a heat exchanger for a motor vehicle exhaust that is can be used to heat the transmission oil (Bennett; Fig. 7; Col 6, Lines 19-28). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the exhaust heat exchange system as taught by Bennett in the system of Claypole for the advantage of rapidly bringing the transmission oil up to nominal operating temperature and to avoid transmission damage.

21. With regards to claim 13, the modified Claypole discloses the exhaust-heat recovery system of claim 12, as described above, and further comprising: a bypass channel along which the heat-transfer medium passes bypassing the oil warmer; a main channel along which the heat-transfer medium passed through the oil warmer; and a

warmer switching valve for closing either the bypass channel or the main channel (Bennett; Fig. 7, 8a, and 8b; Col. 5, Lines 15-30; Col 5, Line 5 – Col. 6, Line 18).

22. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 1 above, and further in view of Bennett (U.S. 6,151,891). The modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, but fails to specifically disclose a bypass channel along which the heat-transfer medium is directly delivered bypassing the exhaust heat exchanger from the engine to the heat exchanger for heating; a main channel along which the heat-transfer medium passes through the exhaust heat exchanger; and a medium channel switching valve for closing either the bypass channel or the main channel. Bennett discloses a heat exchanger for a motor vehicle exhaust that heats transmission oil and has the ability to bypass this circuit so that no heat is exchanged with the transmission oil (Bennett; Fig. 7, 8a, and 8b; Col. 5, Lines 15-30; Col 5, Line 5 – Col. 6, Line 18). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the bypass circuit as taught by Bennett in the system of Claypole, for the advantage of being able to more precisely control the cabin heat source.

23. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Claypole as applied to claim 1 above, and further in view of Nishimura et al. (U.S. 6,044,642). The modified Claypole discloses the exhaust-heat recovery system of claim 1, as described above, but fails to specifically discuss wherein the prescribed heating condition is a minimum temperature of a coolant. Nishimura discloses a direct fuel injection system that uses fuel injected into the engine to control the temperature of a

catalyst and further judges the temperature of the catalyst based on the engines coolant temperature (Nishimura; Col. 3, Lines 34-40). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the catalyst temperature judging means as taught by Nishimura in the system of Claypole for the advantage of a sensing the catalyst temperature without additional hardware.

Allowable Subject Matter

24. Claims 19 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Loren C. Edwards whose telephone number is (571) 272-2756. The examiner can normally be reached on M-TH 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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